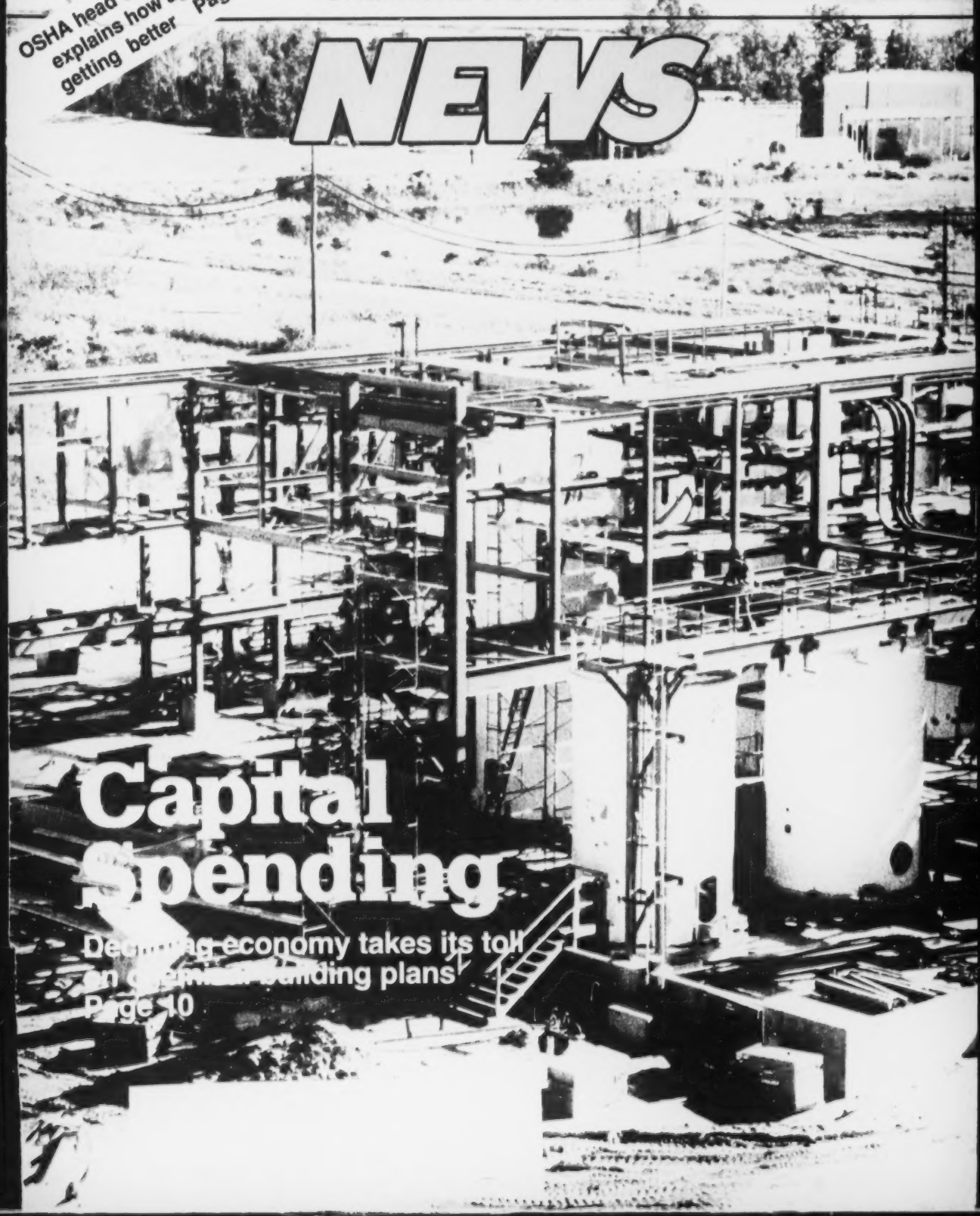
DECEMBER 24, 1990

CHEMICAL & ENGINEERING

OSHA head Gerard Scannell explains how agency is getting better Page 14

NEWS



Capital spending

Declining economy takes its toll on chemical spending plans

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CHEMICAL & ENGINEERING
NEWS
DECEMBER 24, 1990

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News of the Week

■ **Scientists express unease at long-term effects of NIH's new, Congressionally mandated plan to contain biomedical research costs.** **Page 4**

■ **Committee reports cold fusion research at Utah institute carried out in sound manner, but future funding is still in question.** **Page 5**

■ **Massachusetts researchers develop series of amino acid fluorides that may prove useful in peptide synthesis.** **Page 6**

■ **Advisory panel recommends FDA allow first-time marketing of bioengineered immunoprotective proteins.** **Page 6**

Government

OSHA head Gerard Scannell expresses optimism as he discusses his efforts to rebuild confidence in the agency's advocacy for worker safety and improvements in how the agency operates. **Page 14**

Science/Technology

Akron, Ohio, area being revitalized as polymer science and engineering center following its demise as the tire manufacturing capital of the world. **Page 20**

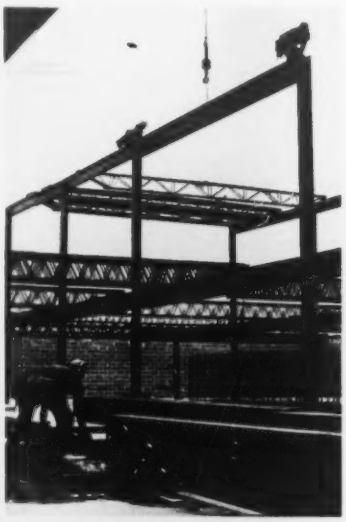
MIT scientists discover decairon molecule, whose coplanar iron atoms are linked via methoxide and carboxylate bridges, and dub it a molecular "ferric wheel." **Page 22**

IUPAC issues new "Red Book" that updates guidelines for naming inorganic compounds and includes new chapters on nomenclature principles and the "grammar" of naming compounds. **Page 22**

ACS News

Nearly a third of ACS's local sections held chemistry week events this year, in spite of no coordinating by national office. **Page 27**

Cover: Mobay's organic pigments plant under construction at Bushy Park, S.C.



Cover Story

Worldwide capital spending by major U.S. chemical companies will slip slightly in 1991, as the weakening domestic economy begins to take its toll. **Page 10**

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LETTERS

A terrible addiction

This is a true story. In the late 18th century was born a new country, one destined for greatness. As the years passed, it blossomed into the most powerful country in the world economically, politically, and militarily. There were many reasons it was able to grow to such strength. For one thing, it was blessed with an abundance of natural resources and raw materials to feed its burgeoning industries. For another, the constitution—and the government sworn to uphold it—promised long-term political stability. But most important was the character of its people. They were strong both morally and physically. They were resourceful, independent, freedom-loving people who believed and demonstrated that the only way to make dreams come true was through dedication, hard work, and a good education.

Then, about 100 years ago, something subtle began happening, something that would eventually threaten the very existence of this great and wonderful country. A chemical substance slowly found its way into widespread use by the people in the country. The suppliers of this "wonder" substance promised it would ease the pain and suffering of all mankind. It would deliver the people from their daily drudgery, and make life easy and pleasurable. The people of the country were seduced into believing them.

New industries developed to import increasing quantities of this substance, and to distribute it far and wide. People's thirst for the new substance grew at an alarming rate. Prices escalated and profits soared to the point that billions of dollars eventually found their way back to the far-away countries where this substance was most readily harvested. People in these countries became rich beyond their wildest imagination. They raised their own powerful armies, then blackmailed, threatened, and destroyed neighboring governments who didn't approve of their appetite for power and riches.

But back in the once-strong country, things were taking a different course. The people had become irreversibly addicted to the substance. Every aspect of their lives revolved around it. It seemed to make life more bearable, but in fact it tended to make the people lazy, overweight, sloppy, and uncaring about their beautiful environment. Yet, they couldn't wean themselves from this terrible addiction.

The final chapter of this story is yet to be written. But there will not be a happy ending unless the people of this once strong and proud country wake up and take notice. They must overcome their seemingly unquenchable lust for this insidious substance. And what is this substance? Oil!

Roger S. Macomber
Professor of Chemistry
University of Cincinnati

Career choices

The recent discussions and proposals regarding the putative shortage of trained scientists available and "in the pipeline," gives one little optimism that things will improve much for the foreseeable future. The facts are that, relative to 20 or 30 years ago, science and scientists are not greatly valued either sociologically or economically in our society. Peer models for the young scientist (teachers, research scientists, etc.) are under tremendous pressure to produce, but often are given neither the time, financial resources, or environment to be creative and productive. Young people in the pipeline, often the brightest, see this and choose other fields that they perceive will provide greater opportunity for creativity that is rewarded.

Where to place the blame can be argued endlessly, but is unlikely to accomplish much. Until attitudes are changed, it is unlikely the career choices made by our best young people will change.

Victor J. Hruby
Department of Chemistry
University of Arizona, Tucson

California Proposition 128

Eric A. Anderson's letter (C&EN, Oct. 29, page 2) prompts me to write. He discussed the California ballot Proposition 128 ("Big Green"), with a pessimistic prediction of its passage, the poor outlook for the lot of chemical professionals in our state, and the difficulty California voters have in determining what the many ballot initiatives mean.

The situation he describes is largely in agreement with my own observations, but I feel he underestimates the power of the democratic process. The use of ballot initiatives to make laws has cer-

Correction

- Nov. 12, page 43: In the letter, "Replace chemical with compound," Robert L. Wolke's affiliation, the University of Pittsburgh, was inadvertently omitted.

Chemical Capital Spending Forecast To Slip in 1991

Stagnant chemical production coupled with increasing concern about a recession and inflation are taking their toll on spending plans

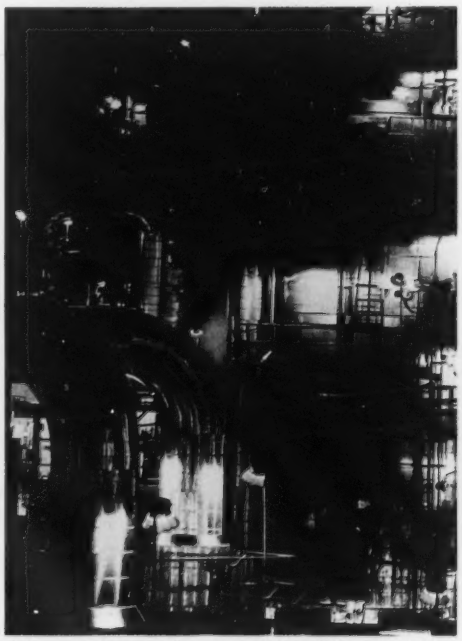
Marc S. Reisch,
C&EN Northeast News Bureau

Worldwide capital spending by major U.S. chemical producers will decline modestly in 1991, the first time spending has declined since 1986, according to preliminary forecasts by leading chemical companies.

For the eight chemical producers responding out of the 12 that C&EN surveys annually, 1991 capital expenditures will decline 3% from 1990 to a combined $7.39 billion. That forecast follows a hefty 17% increase in 1990 compared with the year earlier for reporting firms.

Last year at this time, chemical producers were still experiencing strong sales and earnings and had committed to a number of capital improvement projects. Despite predictions for an economic downturn in 1990, most chemical producers were predicting an increase in their capital expenditures for the year, often as part of a commitment to build new plants made during flush times.

Uncertain economic conditions make this the third year in a row when fewer than 11 companies have responded to C&EN's December survey. In 1987, 11 responded, but in 1988 only nine responded, and in 1989 eight responded. This year only eight responded again, but ironically, Du Pont's capital spending forecast is included in this year's survey, giving a much broader representation of industry trends. Du Pont's forecast has been missing for the past five years because the company's board of directors met too late in the month to approve release of the information. This year a new management structure allowed earlier release of the data.



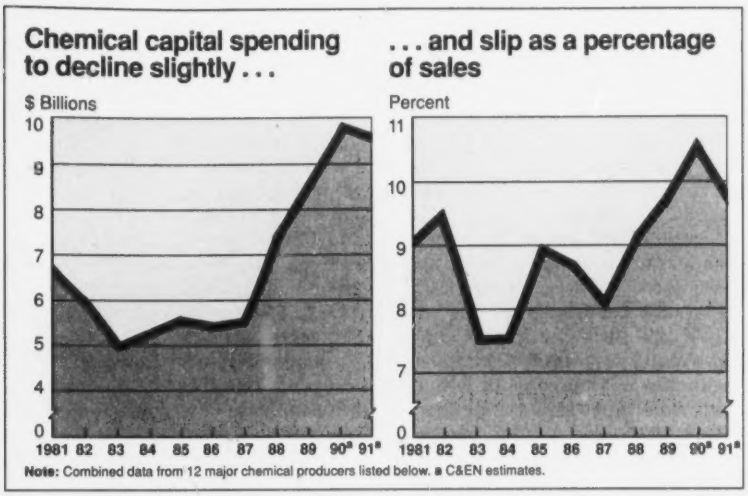
Monsanto's recently expanded maleic anhydride unit at Pensacola, Fla.

As a result, the forecast this year depends on responses from companies representing 70% of the total 1989 capital expenditures (the most recent year for which final expenditures are available for all 12 companies). Du Pont alone accounted for 30% of the capital expenditures of the 12 companies surveyed in 1989. In addition to Du Pont, the companies responding this year are Air Products & Chemicals, American Cyanamid, Dow Chemical, Ethyl, Hercules, PPG Industries, and Rohm & Haas. Missing this year are responses from W. R. Grace, Monsanto, Olin, and Union Carbide. Last year's survey depended on companies representing only 52% of 1989 capital expenditures (C&EN, Dec. 18, 1989, page 9).

Predictions for a decline in the capital spending plans in 1991 for individual companies are much more pronounced than the average decline of 3%. Rohm & Haas predicts capital expenditures will fall 26% in 1991 to $325 million, and PPG is not far behind with a 23% decrease. Hercules' plans call for a 14% decline in capital spending to $225 million. Du Pont plans a modest spending cut of only 2% from this year to $3.2 billion in 1991. On the positive side, only Ethyl predicts a double-digit increase, 23%, in capital spending to $185 million. Air Products plans a hike of 6% to $660 million, and Dow plans to raise spending only 3% to $2 billion.

According to Du Pont's chief economist, Richard A. Stuckey, currently falling cash flow and concern about both a recession and inflation are not positive indicators for capital spending. Further, November declines in industrial production and a factory operating rate of 80% for industry, according to the latest government statistics, are "negative signals for prospective capital spending."

In his opinion, capital spending is likely to fall in 1991. About 30% of capital spending goes into building new structures, and contracts awarded for new structures have declined 25% compared with a year ago, he says. The worst is yet to come, he



Note: Combined data from 12 major chemical producers listed below. a C&EN estimates.

adds, since capital spending has only begun to slip. He points out that capital expenditures are a lagging indicator because appropriations for new projects under way cannot simply be turned off.

But there is a silver lining in Stuckey's description of a gloomy capital spending picture. U.S. manufacturers are still taking a long-term view of their businesses. It is likely then that some capital projects, such as those for new plants and major expansions, will be pushed into 1992 or 1993. Projects that have the potential to give their owners good returns will not be canceled, only deferred, he says.

As for sales in 1991, Stuckey is projecting increases, but says they will be due mostly to the pricing of oil and strength in overseas sales of U.S. products. The price of oil will be the wild card, with much depending on what happens in the Middle East standoff between the U.S. and Iraq. Stuckey believes that the volume of chemical production in 1991 will actually fall several percentage points as a result of continuing weakness in the housing, automotive, and home furnishings industries.

Given the backlog of projects to which many chemical companies were committed in 1990, C&EN estimates that industry capital spending as a percentage of sales will weigh in at a hefty 10.7% in 1990. So far 1990 has been a year in which sales grew 10% in the first nine months for 30 major chemical companies (C&EN, Nov. 12, page 16), but also a year in which earnings declined 25% during the same period. In last year's survey, C&EN correctly predicted an increase in capital spending as a percentage of sales for 1990, but at 9.7% of sales understated the final number.

For 1991, C&EN estimates that companies still will spend a respectable 9.8% of sales on capital projects, based on the assumption that sales will grow at 7% in 1991 for the 12 firms surveyed. The high historical investment in capital improvements projected for 1991 seems to prove Stuckey's point that such spending is a lagging economic indicator.

In a recent survey of its membership, the Chemical Manufacturers Association predicted that the chemical industry will increase its capital expenditures 13% in 1991 from 1990, a finding very much at odds with C&EN's forecast of a 3% decrease based on its most recent survey. CMA estimates that capital expenditures for the chemical industry in 1990 rose 2% above 1989 spending—again in contrast to C&EN's forecast this year of a 17% increase based on responses from 11 of 12 companies in its survey.

Although overall 1991 capital ex-

Capital spending of surveyed companies will decrease 3% next year

	1991		1990		Worldwide					Change from previous year	
$ Millions	Total	U.S.	Total	U.S.	1990 planned[a]	1989	1988	1987	1986	1991	1990
Air Products[b]	$ 660	$ 440	$ 621	$ 342	$ 600	$ 414	$ 409	$ 323	$ 367	6%	50%
American Cyanamid[c]	370	270	370	270	na	398	374	268	263	0	-7
Dow Chemical	2000	1160	1950	1050	2100	1695	1670	995	890	3	15
Du Pont[d]	3170	2320	3220	2360	na	2563	2029	1674	1587	-2	26
Ethyl[e]	185	130	150	100	240	119	151	139	134	23	26
W. R. Grace	na	na	460	na	550	485	418	243	199	na	-5
Hercules	225	180	260	208	225	293	251	205	257	-14	-11
Monsanto	na	na	700	525	na	607	590	505	520	na	15
Olin	na	na	175	na	175	142	147	115	128	na	23
PPG Industries	450	300	585	390	450	537	410	426	356	-23	9
Rohm & Haas	325	240	440	320	395	385	338	222	179	-26	14
Union Carbide	na	na	na	na	na	785	671	502	524	na	na
TOTAL	$7385	$5040	$8931	$5565	$4735	$8423	$7458	$5617	$5504		
ANNUAL CHANGE[f]	-3%	0%	17%	5%		13%	33%	4%	-4%		

a Earliest estimate. b Fiscal year ends Sept. 30. c 1990 and 1991 exclude expenditures for Shulton Group, which has been sold. d Excludes Conoco. e 1989, 1990, and 1991 figures adjusted to reflect spin-off of Tredegar Industries in July 1989. f Cumulative change for companies reporting. na = not available.

German chemical giants boost U.S. spending

The three German chemical giants are so far unable to forecast their 1991 capital expenditure plans. Only one company last year, BASF, was able to make any predictions for the 1990 survey. However, the three companies can forecast their 1991 capital expenditures in the U.S. for the coming year, and as a group they plan to increase spending 10% to $1.3 billion.

Bayer plans the largest hike in the U.S. during 1991, with expenditures up 23% to $400 million. Meanwhile, Hoechst plans to spend $420 million in 1991, up 5% from its latest estimate of 1990 spending, and BASF will boost its U.S. expenditures 4% to $500 million. The increase in U.S. capital expenditures follows a much slower pace of annual increase in 1990 of 3%. For this year, Hoechst raised U.S. spending at its Hoechst Celanese unit 7% to $400 million, BASF increased spending 4% to $480 million, and Bayer decreased spending 2% to $325 million.

Collectively BASF and Bayer will have doled out $5.3 billion worldwide in 1990 on capital expenditures, according to their latest estimates. That level of expenditures marks a 35% increase over the 1989 level. Separately, BASF's 1990 spending level of $3 billion amounts to a 43% increase over 1989, and Bayer's $2.3 billion in 1990 spending is a 27% increase.

Compared with their U.S. counterparts who plan no increase in domestic capital spending, the German chemical giants will boost their spending in the U.S. in 1991 10%. If they elect to finance that investment with deutsche marks, they will be doing so with a much more favorable exchange rate. Last year C&EN used a conversion rate of $1.00 = 1.8 deutsche marks, an average conversion rate for 1989. This year, that conversion rate is $1.00 = 1.5 deutsche marks. That means that deutsche marks at this rate can buy 20% more U.S. dollars, and thus the German companies can actually spend fewer marks to do the work of more U.S. dollars. U.S. investment figures provided by the three companies surveyed in the U.S. were in U.S. dollars, while the worldwide numbers were quoted in deutsche marks and converted to U.S. dollars.

	1991		1990		Change from previous year	
$ Millions[a]	Total	U.S.	Total	U.S.	1991	1990
BASF	na	$ 500	$3000	$ 480	na	43%
Bayer	na	400	2333	325	na	27
Hoechst	na	420	na	400	na	na
TOTAL	na	$1320	$5333	$1205		
ANNUAL CHANGE[b]	na	10%	35%	3%		

a $1.00 = 1.5 deutsche marks. b Cumulative change for companies reporting. na = not available.

penditures likely will decline 3% in 1991 according to this survey, spending in the U.S. will remain unchanged for the group. Three of the eight who responded predict double-digit increases in their domestic spending in 1991 compared with 1990, in effect canceling out the decline in spending projected by the remaining six. Ethyl leads the group with a planned increase of 30% to $130 million in domestic capital spending, followed by Air Products with a projected increase of 29% to $440 million, and Dow with an estimated increase of 10% to $1.2 billion.

Those planning lower U.S. capital spending in 1991 are Rohm & Haas, down 25% to $240 million; PPG, down 23% to $300 million; Hercules, down 14% to $180 million; and Du Pont, down 2% to $2.3 billion. American Cyanamid predicts its 1991 domestic spending plans will remain unchanged from its 1990 expenditures of $270 million in the U.S. The 1990 and 1991 figures from American Cyanamid exclude spending for Shulton Group, which was sold during the past year.

Collectively, 1990 capital expenditures of 11 of the 12 companies responding to questions about this year's spending have risen to $8.9 billion, a 17% increase over combined spending by the group in 1989. Eight of the eleven predict that they will end the year spending considerably more than they had in the previous year. Air Products spent 50% more on capital improvements in 1990 with a total of $621 million. Du Pont and Ethyl both increased their expenditures 26%, with Du Pont's spending up to $3.2 billion and Ethyl's up to $150 million. Olin showed the next largest improvement, with capital expenditures up 23% to $175 million. Rohm & Haas also says it will end 1990 with a double-digit increase in capital expenditures, up 14% to $440 million, and PPG increased its spending 9% to $585 million.

Three of the 11 companies reporting for 1990 say they will end the year with a decrease in capital outlays. Hercules projects an 11% decrease to $260 million, and American Cyanamid, shorn of its Shulton Group, says it will have a decrease in capital outlays of 7%. Grace plans to end 1990 with a decline of 5% to $460 million.

As a measure of how plans change during the course of the year, only one of seven companies who gave C&EN its earlier estimate of capital spending for 1990 did not change its most recent 1990 spending account. Olin told C&EN that it planned to spend $175 million when first surveyed in 1989 and when surveyed again this month still maintained that it will spend that same amount. PPG's latest spending plans swelled 30% to $585 million, compared with its earlier estimated expenditures of $450 million. Hercules increased its spending plans 16% from its earlier estimates, and Rohm & Haas increased its spending total 11%.

Only two companies spent significantly less in 1990 than they originally planned. Ethyl first planned to spend some $240 million when it was surveyed a year ago, but it finally spent 38% less than that, at $150 million—still 26% more than it had spent during 1989. Dow also overestimated what it would spend in 1990 and now believes it will actually have spent 7% less than it planned for when first contacted a year ago.

Taken as a group, there is little discrepancy between the earliest spending plans and the most recent spending plans of the group. □